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# U. S. DEPARTMENT OF AGRICULTURE

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## VARIETIES *&* COMMON WHITE WHEAT



**T**HE common white wheats include those winter and spring varieties of common wheat that have either soft or hard white kernels. Washington, Idaho, Oregon, Michigan, New York, and California lead in production of these varieties. Nearly 4,000,000 acres are grown annually in the United States, comprising about 6.3 percent of the total wheat acreage.

Most of the common white wheats are soft and are used in making biscuit and pastry flours and breakfast foods or are blended with hard wheats for bread flours. Forty-four varieties are grown commercially in the United States; 28 are spring wheats and 16 are winter wheats.

Goldcoin is the most widely grown white wheat. It is the most important variety in Michigan and New York and is grown extensively in limited areas of the Pacific Northwest. It is a winter variety, shatters easily, and is not adapted to dry, windy areas or to areas where harvest is delayed after the grain is mature.

Baart is the most productive spring wheat in those sections of Washington where the rainfall is less than 15 inches. It is well adapted to Arizona and to the drier sections of California and is suitable for breadmaking.

Federation, although a spring variety, is extensively grown from fall seeding in Umatilla County, Oreg., and in adjacent Washington, where it outyields all other varieties when not injured by winter-killing. It also gives high yields from spring sowing in eastern Oregon and Washington and on the irrigated lands of southern Idaho.

Pacific Bluestem is a productive spring wheat in eastern Washington and northern Idaho where the rainfall exceeds 15 inches, and is well adapted to fall sowing in the Sacramento Valley of California.

Dicklow is extensively grown under irrigation in southern Idaho and in Utah, where it commands a premium from millers because of its white color and desirable quality for biscuit and pastry flours.

Quality is the only white wheat grown to any extent in North Dakota, South Dakota, and Minnesota, because of the limited demand for an early variety. It should be replaced by Reward or other hard red spring varieties.

This bulletin is a revision of and supersedes Farmers' Bulletin 1301, The Common White Wheats.

# VARIETIES OF COMMON WHITE WHEAT<sup>1</sup>

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## COMMON WHITE WHEATS DEFINED

THE common white wheats include those varieties of common wheat having white kernels. Under the official grain standards of the United States, wheat is graded into five classes, one of which is designated as class V, white wheat. This class includes the white-kerneled varieties of both common and club wheats, but only the common wheats are considered in this bulletin. Although most of the durum varieties also have white kernels, they are designated as a separate class.

The kernels are described as white because they lack the coloring matter or pigment in the seed coat, or bran, which red wheats possess. They are not really white, but pale yellow. They may be hard and translucent (amber) or soft and opaque. Both winter and spring varieties are grown.

More than 3,900,000 acres, or about 6.3 percent of the wheat acreage of the United States, are annually devoted to the production of this class of wheat, of which 44 varieties are grown commercially.

## WHERE GROWN

Common white wheats are grown principally in the Pacific coast region. Washington, Idaho, Oregon, and California lead in their production. Michigan, New York, Utah, North Dakota, Montana, and Colorado also produce a large acreage. The section of heaviest

<sup>1</sup> The information in this bulletin is based upon (1) varietal experiments conducted by the Division of Cereal Crops and Diseases, Bureau of Plant Industry, U.S. Department of Agriculture, in cooperation with State agricultural experiment stations; (2) classification studies of all American wheat varieties; (3) a survey of the wheat varieties of the United States, in cooperation with the Bureau of Agricultural Economics, based upon about 10,000 returns from 74,000 questionnaires sent to crop correspondents; and (4) personal observations from several years by the writers in the wheat fields in the States where these varieties are grown.



production is in eastern Washington and eastern Oregon. The distribution of common white wheats in the United States in 1929 is shown in figure 1. It was estimated that 3,905,083 acres of common white wheat, including Sonora, were grown in that year. While not so extensively grown as most other classes, white wheat is the leading class in Arizona, California, Idaho, Nevada, New York, Oregon, and Washington.

In general, the common white wheats are adapted to the districts of heavy production shown in figure 1. In Michigan, New York, and other Eastern States only winter varieties are grown. In Arizona, California, Colorado, Utah, and Nevada nearly all the common white wheats are spring varieties, although they are usually fall sown except in Colorado and Utah, where they are spring sown in irrigated districts. In the other Western States both winter and spring varieties are grown.

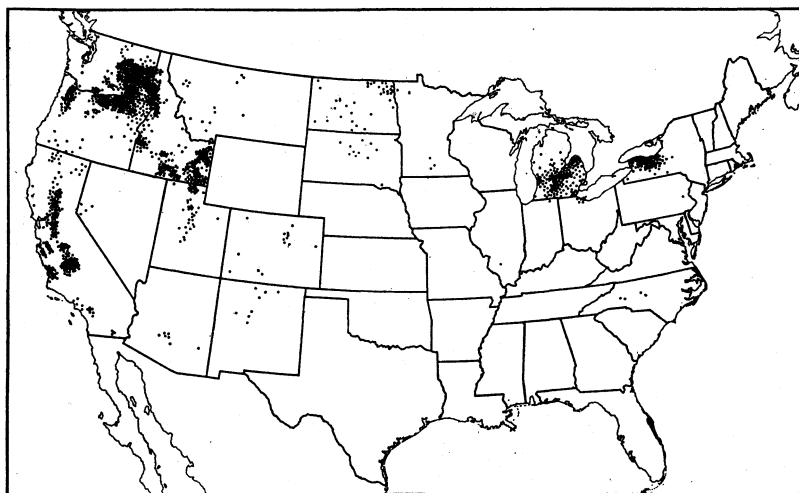


FIGURE 1.—Distribution of common white wheats in the United States in 1929. Each dot represents 2,000 acres. Estimated area, 3,905,000 acres.

Common white wheats produce the highest comparative yields in most of Arizona, California, Nevada, Oregon, southern Idaho, and western Montana. They usually are outyielded by winter varieties of the club wheats in the more humid sections of eastern Washington and northern Idaho and by hard red winter varieties in the drier sections. Certain common white varieties usually are the most productive of the spring wheats in these sections. White wheats generally produce higher yields under irrigation than do hard red spring varieties, and are of considerable importance in the irrigated sections of the Intermountain and Pacific Coast States.

Winter varieties of common white wheat are well adapted in New York, Ohio, and parts of Michigan. However, the soft red winter wheats are more important in Ohio and Michigan because of the larger demand and better price for red wheat in that area. Superior lots of white wheat may, however, in some instances carry substantial premiums. In the eastern half of the United States the red wheats usually outyield the common white varieties.

## USES

In general, the common white wheats are inferior to the hard red spring and hard red winter wheats for bread making. However, a few common white varieties have high bread-making value and are ground into bread flour without being blended with other classes. The common white wheats are grown chiefly in irrigated and non-irrigated areas where soil and climatic conditions are unfavorable for the production of wheat having a high protein content.

The common white wheats, if soft and starchy, are well suited to the manufacture of biscuit and pastry flours, crackers, and breakfast foods. Large quantities of common white wheat are utilized for these purposes in both the eastern and western parts of the United States. Except in small local mills, the wheat or flour from soft common white varieties is blended with that from good hard white or hard red spring or hard red winter varieties for manufacturing bread flours. The soft white wheats are extensively exported to western Europe and the Orient. In certain localities there also is a local demand for white wheat for special purposes, such as making whole-wheat products. This demand results in good prices. In the sections where common white wheats are best adapted they usually are more profitable than other classes.

## VARIETIES

Approximately 44 distinct varieties of common white wheat, known by about 150 names, are grown commercially in the United States. Of these 44 varieties, 18 were reported grown on less than 5,000 acres each in 1929, and are listed in this bulletin as additional varieties. Of the 44 varieties, 28 are spring wheats and 16 are winter wheats. They differ widely in yield, quality, earliness, and adaptation, as well as in general appearance and behavior. For convenience, the varieties of common white wheat are here arranged into seven groups on the basis of the most easily observed characters of the head, chaff, and plant.

*Group 1.*—Heads beardless; chaff smooth, white or yellow; winter wheats: White Winter, Wilhelmina, Eaton, Greeson, Prohibition.

*Group 2.*—Heads beardless; chaff smooth, white or yellow; spring wheats: Pacific Bluestem, Dicklow, Quality, Bunyip, Defiance, White Federation, Rink, Surprise, Onas Pilcrow.

*Group 3.*—Heads beardless; chaff smooth, brown or red; winter wheats: Goldcoin, Dawson, Honor.

*Group 4.*—Heads beardless; chaff smooth, brown or red; spring wheats: Federation, Hard Federation.

*Group 5.*—Heads beardless; chaff velvety, white; winter wheat: Silvercoin.

*Group 6.*—Heads beardless; chaff velvety, brown or red; spring wheats: Sonora, Galgalos.

*Group 7.*—Heads bearded; chaff smooth, white or yellow; spring wheats: Baart, Propo.

**GROUP 1.—HEADS BEARDLESS; CHAFF SMOOTH, WHITE OR YELLOW;  
WINTER WHEATS**

Five winter varieties are included in this group. The kernels range in size from small to large. The heads of some varieties are long and open, while others have shorter, more compact heads, somewhat clubbed at the tip. The varieties in group 1 can be successfully grown only from fall sowing.

## WHITE WINTER

White Winter, known also as Bishop's Pride, Oregon White, and Wold's White Winter, has beardless heads, smooth white chaff, and soft white kernels. The heads are erect, of medium length, compact, and square tipped. The kernels are short and rounded. It is a late-maturing winter wheat and will not produce a crop if sown in the spring. It is not very hardy as a winter wheat.

This is one of the oldest wheats grown in western Oregon, being the principal variety as early as 1855, probably having been introduced from England. It is now grown in the humid sections of western Oregon and western Washington, also in one county in northern California.

White Winter is one of the highest-yielding varieties in the Willamette Valley of Oregon. Because of its late maturity it is adapted only to humid sections having cool summer weather. It can be grown with success in the United States only in the humid areas of the Pacific Northwest. Because the grain is soft and starchy, flour from White Winter is not suitable, under modern commercial bakeshop practice, for making bread of high quality.

## WILHELMINA

Wilhelmina wheat, known also as Queen Wilhelmina and Holland, is a late-maturing winter variety adapted only to the humid sections of western Oregon and Washington. It was introduced under the name Queen Wilhelmina from the Netherlands by the Oregon Agricultural Experiment Station about 1914. A few years later it was distributed as Holland in the Willamette Valley of western Oregon where it is now one of the leading varieties. Wilhelmina is recommended for growing in the Willamette Valley and may profitably replace such varieties as Red Russian, Defiance, Hybrid 128, and Eaton.

## EATON

Eaton is nearly identical with White Winter, but differs from it in having a slightly clubbed head. It is not known where Eaton originated, but it probably is an old English variety like White Winter. It has been known in the United States at least since 1894. It is now grown as a winter wheat in northwestern Oregon but not in large quantities.

Eaton is about equal to White Winter in yield and quality and is adapted to nearly the same conditions.

## GREESON

Greeson, or Greensboro, is very similar to Prohibition, but has slightly longer heads. The kernels are more tapering and not "humped" like those of Prohibition.

Greeson is reported to have been originated by a Mr. Greeson, of Guilford County, N.C. It was distributed a number of years ago and is now grown in three counties in North Carolina. Nothing is known about its yielding ability as compared with that of other varieties except that it has become rather popular in the locality where it was originated.

## PROHIBITION

Prohibition, known also as Prohi, is somewhat shorter and earlier than White Winter, and the heads are slightly longer and less erect. The kernels are rather small, soft, and distinctly humped.

Prohibition was named and distributed by B. H. Irvine, of Scio, Oreg., about 1885. The seed had been obtained from the Commissioner of Agriculture at Washington under another name. It was distributed in the vicinity of Scio, in Linn and Marion Counties, Oreg., where it is now grown on the red-hill lands.

Prohibition apparently is adapted to a limited section of the Willamette Valley of Oregon, outside of which it has scarcely been grown or tested. Owing to its lateness it is adapted only to cool, humid sections.

GROUP 2.—HEADS BEARDLESS; CHAFF SMOOTH, WHITE OR YELLOW;  
SPRING WHEATS

Most of the varieties in group 2 have slender, pointed heads, but a few have compact, square, or club-shaped heads. Although these varieties are true spring wheats, several are grown from fall sowing in areas where the winters are mild.

## PACIFIC BLUESTEM

Pacific Bluestem, the Bluestem wheat of the Pacific Coast States, is also known as Australian, Chile, Palouse Bluestem, White Australian, White Bluestem, White Chile, and White Elliott. It has beardless heads with yellowish-white to light-brownish chaff and soft to semihard white kernels. The heads are erect and nearly square, although they taper slightly at the tip (fig. 2, A). The chaff is stiff and wide and not easily broken off. The kernels are of medium size and rather soft but are harder than those of some of the common white varieties. Pacific Bluestem is a true spring wheat, although it is grown from fall sowing in the mild climate of California and Arizona and occasionally in Oregon.

Pacific Bluestem is a very old wheat. It formerly was called White Lammas and was the leading variety in Australia during the early years of wheat production in that country. It was introduced from Australia into California during the early fifties. It is generally known as White Australian in California but is called Bluestem in the Pacific Northwest. Pacific Bluestem was introduced into the Pacific Northwest in 1882, having been grown first in the Walla Walla Valley of Washington. It was for many years the most widely grown variety of common white wheat, but its acreage decreased from 1,363,000 acres in 1919 to about 364,000 acres in 1929. It is grown in all States west of the Rocky Mountains and is of greatest importance in Washington, California, Idaho, and Oregon. Its distribution in 1929 is shown in figure 3.

In the Sacramento Valley of California, Pacific Bluestem usually is sown in the fall or winter and is considered a winter wheat by many growers. Until recently no variety has been able to compete with it in that section. However, since 1918 it has been exceeded in acreage by Baart. It usually is outyielded by Baart and Bunyip in the San Joaquin Valley and by Baart, Defiance, and Sonora on the irrigated lands of southern California and Arizona.



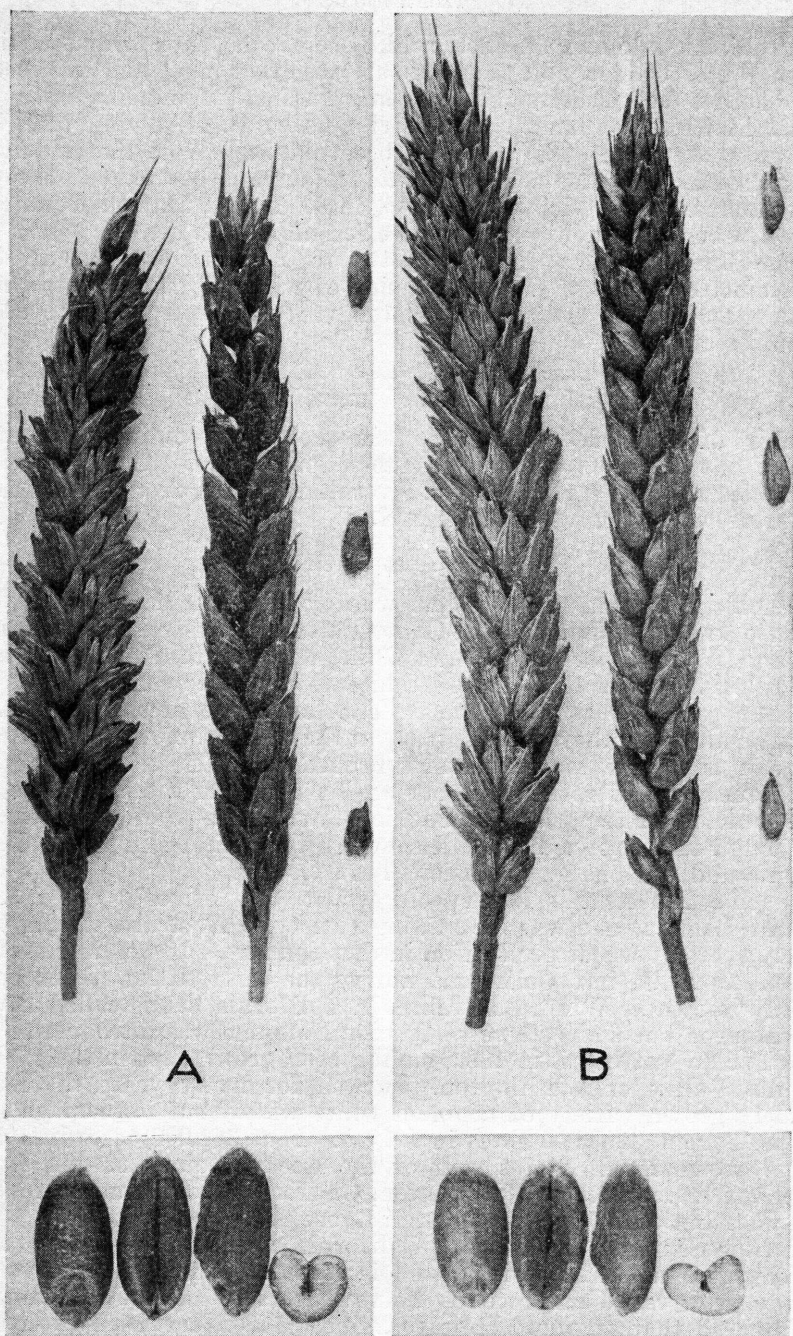


FIGURE 2.—Heads, chaff, and kernels of (A) Pacific Bluestem and (B) Dicklow. Heads and chaff, natural size; kernels, three times natural size.

Pacific Bluestem is still an important variety in Lincoln and Douglas Counties in eastern Washington, but has been largely replaced by Federation in the Palouse district of Washington and Idaho and by Baart in the Big Bend section of central Washington, where the rainfall is less than 15 inches.

Pacific Bluestem is considerably outyielded by Federation and Dicklow in the irrigated sections of Utah and southern Idaho. It was for many years considered the best milling and baking wheat grown in the Pacific Coast States, but since the introduction of hard red winter and hard red spring varieties within the last 30 years it has lost this leading position. It is now considered inferior to Baart.

#### DICKLOW

Dicklow wheat, known also as Dago, Hawley, Holly, Jim Holley, and Richard Low, is almost identical with Surprise, from which it was selected. It is one of the types found in Surprise. Dicklow can be distinguished from Surprise by the heavy white waxy bloom on the stems just before ripening. It is a late-maturing spring wheat. Its heads are quite clubbed at the tip (fig. 2, B). The kernels of Dicklow are soft and somewhat flattened.

Dicklow was selected from a field of Surprise or California Club in Utah County, Utah, by Richard Low. It spread rapidly over northern Utah. In 1912 and 1913 it was distributed in southern Idaho, where it is still one of the most important varieties grown under irrigation.

At present Dicklow is grown chiefly in southern Idaho and Utah, but there are smaller acreages in Washington, Montana, Wyoming, Colorado, Nevada, Oregon, and California. More than 250,000 acres of Dicklow wheat were grown in 1929. The section of heaviest production is in the vicinity of Twin Falls, Idaho.

Dicklow has outyielded all other varieties except Federation on the irrigated lands of southern Idaho and northern Utah. In experiments during the 13 years from 1919 to 1931 Dicklow has been outyielded by Federation and partly replaced by it. These two varieties should be grown to the exclusion of all others on the irrigated lands of southern Idaho and northern Utah. The chief objections to Dicklow are susceptibility to loose smut, tendency of the heads to shatter, and weakness of straw. In Federation the tendency to lodge and shatter has been largely overcome.

Outside of southern Idaho, northern Utah, and the lower Yakima Valley of Washington, Dicklow is not especially promising even

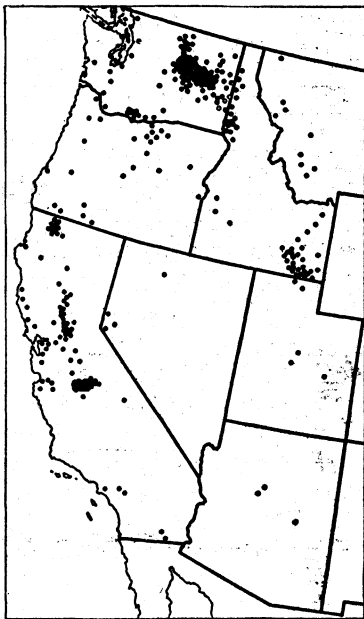


FIGURE 3.—Distribution of Pacific Bluestem wheat in 1929. Each dot represents 1,000 acres. Estimated area, 364,000 acres.

under irrigation. Because of its late maturity it is not adapted to the dry-land sections.

Dicklow is very much in demand by the millers of southern Idaho for making biscuit and pastry flour. There it usually commands a premium over Federation because its flour is whiter.

#### QUALITY

Quality (Burbank's Quality) is an early-maturing spring wheat. The heads are beardless, erect, tapering, of medium length, and have smooth, white chaff (fig. 4, A). The kernels are rather short and hard and shatter from the heads very easily at maturity. Although Quality is a spring wheat, it can be grown from fall sowing in mild climates like that of California.

Quality was first distributed from Santa Rosa, Calif., by Luther Burbank in 1918, although its origin is not known. It is grown now in many other States.

Quality is outyielded by nearly all varieties now grown in the Sacramento Valley of California. It shatters so easily when ripe that it cannot be harvested with the combined harvester without much loss of grain. In North Dakota, South Dakota, Minnesota, and Montana, where Quality is grown as a spring wheat, it is outyielded by Marquis, Ceres, and other varieties of hard red spring wheat. More than 130,000 acres of this variety were grown in 1929. It cannot be successfully grown from fall sowing except in California and Arizona, because it is not a winter wheat and cannot survive ordinary winter temperatures.

Quality wheat has hard kernels, and for making bread the flour from this variety compares favorably with that from hard red spring wheats.

#### BUNYIP

Bunyip wheat is much earlier maturing and shorter in height than Pacific Bluestem and has a slightly harder kernel. The heads are beardless, or tip awned, broad but tapering, and the chaff is yellowish white with brown stripes (fig. 4, B). The brown stripes give the heads a brown appearance in the field. Bunyip is a spring wheat but is usually grown from fall sowing in California. Although it is early maturing and short, the straw is not very strong, and sometimes lodges.

Bunyip was originated in 1897 by William Farrer, New South Wales, Australia, from a cross between Rymer and Maffra wheats. It was first introduced into the United States by the Department of Agriculture in 1914. A sample was obtained by the Sperry Flour Co., from the Australian exhibit at the Panama-Pacific Exposition of 1915. Bunyip was distributed in California in 1918 by the company mentioned after it had been tested in comparison with a few other Australian varieties. It is now grown extensively in the San Joaquin Valley and to some extent in other sections of California, and has produced good yields. It is a better yielder than Pacific Bluestem on lighter and drier soils and is preferred to Baart by many growers because the heads are beardless. More than 100,000 acres of Bunyip were grown in 1929. Bunyip is superior to both Pacific Bluestem and Baart in milling and bread-making qualities.



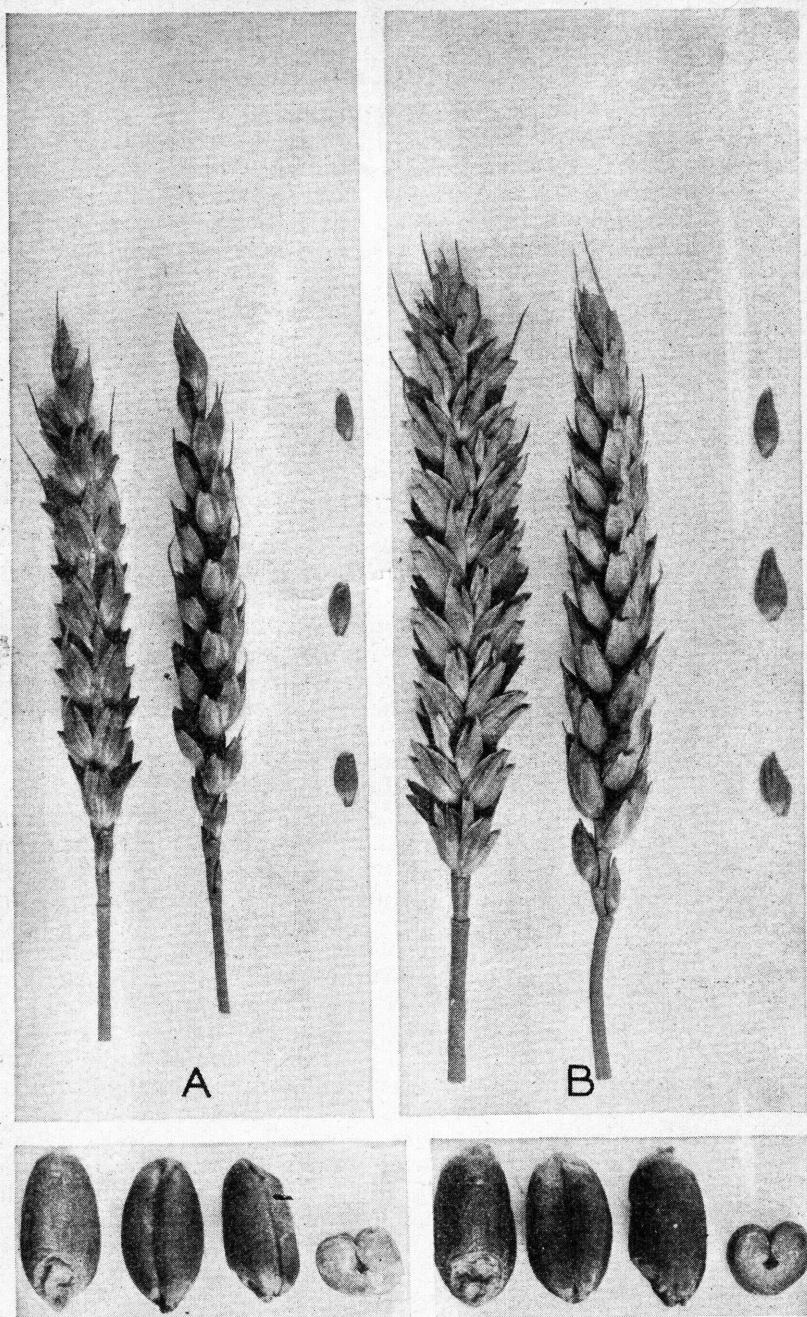


FIGURE 4.—Heads, chaff, and kernels of (A) Quality and (B) Bunyip. Heads and chaff, natural size; kernels, three times natural size.



## DEFIANCE

Defiance (Pringle's Defiance) is a tall, midearly, white spring wheat having mostly slender, tapering heads. There is much variation in the size and shape of the heads and in the number and length of the short tip beards. The kernels are white and of varying degrees of size and hardness, but for the most part are mid-sized and rather soft. The straw is fairly stiff and does not lodge easily on irrigated land. Defiance is rather resistant to the forms of stem rust that occur along the coast of California. As grown commercially, Defiance is a mixture of several types of beardless white-kernelled wheat.

Defiance was originated in 1871 by Cyrus G. Pringle, of Charlotte, Vt., from a cross between White Hamburg and Golden Drop wheats. It was first distributed in 1878 by a seed firm and eventually found its way into the western United States. It was not entirely purified before being distributed, but since then several selections have been made.

Defiance is grown to a limited extent mostly under irrigation, in nearly all of the far Western States. It is most important in Colorado and California.

Regenerated Defiance is a taller and later variety having a larger head than Defiance. The heads are wide and nearly square at the tip. The kernels are short, hard, and angular. Regenerated Defiance was selected from Defiance by A. E. Blount, of the Colorado Agricultural Experiment Station, before 1891. It was first distributed from the Colorado station in 1907 and is now grown in Colorado, Idaho, Montana, and New Mexico, although it is not of much importance there.

Early Defiance, a strain or selection of Defiance that has been distributed in recent years by a Los Angeles (Calif.) seed firm, differs from Defiance in maturing several days earlier and in having no tip beards on the heads. The kernels are rather long and pointed. Early Defiance is grown in San Diego County, Calif., and probably in other localities. Little is known about its yielding ability and quality.

Escondido, a selection from Defiance developed in cooperative experiments at the University Farm, Davis, Calif., was reported in 1929 as having been grown on about 2,000 acres in southern California.

The strains of Defiance are adapted to the humid valleys along the California coast, where they withstand rust better than do most other varieties. They are fall sown in California and sometimes in the Willamette Valley of Oregon. They are fairly well adapted as spring wheats in the irrigated sections of southern Colorado. Defiance usually is outyielded by other varieties in northern Colorado, southern Idaho, Utah, and Arizona. The growing of the mixed, unselected, and poorer strains of Defiance should be discontinued.

## WHITE FEDERATION

White Federation wheat is short and extremely early. The heads are short, erect, almost entirely free from short beards, nearly square at the tip, and do not shatter easily. The chaff is wide

and thick. The kernels are short, wide, and hard. The straw is stiff and the leaves are distinctly curled. White Federation is very similar to Hard Federation, except that it has white chaff, softer kernels, and is slightly taller.

White Federation, with Hard Federation, was selected from the Federation variety, from which both probably originated by natural crossing. White Federation was introduced into the United States by the Department of Agriculture in 1916. It was first distributed in California in the fall of 1919 from the United States Plant Introduction Garden at Chico, Calif. Nearly two thirds of the acreage grown in California is in San Luis Obispo County, where it is well adapted. White Federation is equal or superior to Hard Federation in yield in Oregon and Washington. It is superior to most white-kernelled commercial varieties in bread-making qualities.

#### RINK

Rink wheat has wide flat heads and rather small, soft, white kernels. The heads are considered beardless, but short, sharply incurving beards occur throughout their length.

The origin of Rink is not known. The variety has been grown in Washington County, Oreg., at least since 1909. It is now grown in Washington and adjacent counties in the Willamette Valley of Oregon. It is a late-maturing variety of spring wheat, but is grown largely from fall seeding.

#### SURPRISE

Surprise (Pringle's Surprise) is known chiefly by the following names: Australian Club, Bay, California Club, California Gem, Excelsior, Golden Gate Club, Imperial Club, Mormon Club, Pride of California, Silver Chaff, Silver Club, Smith Club, University Gem, and White Russian. It has erect, compact heads, with clubbed tips, but is not a club wheat. The kernels are of about medium size, but appear flattened and are soft. It is a late-maturing spring wheat. There is much variation in the plants, heads, and kernels of Surprise, indicating that it contains several types.

Surprise was originated by Cyrus G. Pringle, of Charlotte, Vt., the originator of Defiance. It is the result of a cross between Chile Club (Big Club) and a variety of common wheat known as Michigan Club. After being increased, the entire supply of seed was sold as Pringle's Surprise to the United States Commissioner of Agriculture for distribution. It was found to be adapted only to the western part of the United States. In time many other names were applied to it, and its identity was almost lost. At the time of its distribution Surprise had not been purified and it still lacks uniformity. It is now grown partly under irrigation in Washington, California, Colorado, Utah, and Wyoming.

Because of its late maturity Surprise is best adapted to irrigated lands and to cool humid sections. Under such conditions it is a good-yielding variety. However, it has been replaced by Dicklow and Federation in the irrigated districts of Utah and Idaho. It has largely been replaced by Pilcrow, known locally as Thompson and White Russian, and by Jenkin in the Yakima Valley of Washington where irrigation is practiced.

## ONAS

Onas is a short, fairly early variety having stiff straw, erect, oblong, compact heads with white chaff, and almost no tip beards. The kernels are white, rather short, and usually soft. Onas is a true spring wheat, but is grown from fall sowing in mild climates like that of California. In Washington and Oregon it is adapted only to spring sowing.

Onas was introduced from Australia by the United States Department of Agriculture in 1918. It was developed by F. Coleman from a cross with Federation as one parent. After having been tested in cooperative experiments in the Pacific Coast States, seed was distributed from the University Farm at Davis, Calif., in 1923.

Onas has produced good yields on farms in Monterey and adjacent counties and in the Sacramento Valley of California. It yields about the same as Federation in the more humid sections and under irrigation in the Pacific Northwest. It has yielded about the same as Baart in experiments under the extreme drought conditions at Lind, Wash. The variety seems to have an unusually wide adaptation in the Intermountain and Pacific Coast States.

In 1929 Onas was reported to be grown on about 17,000 acres in California and to a very limited extent in Oregon and Washington.

## PILCRAW

Pilcrow, also known as Pilcrow Enormous, White Russian, Thompson, or Thompson Club, has erect, compact heads, distinctly clubbed at the tip. Although the variety is beardless, the upper meshes of each head have several short beards ranging in length from one half inch to more than 1½ inches. The kernels are large, thick, plump, humped, and soft. It most closely resembles Surprise, but differs from it chiefly in having larger kernels and longer tip beards.

The origin of Pilcrow has been traced to a plant found growing along the roadside in Napa County, Calif. The progeny of this plant was increased by Hugh A. Crawford, of Napa, Calif., from 1913 until 1917, when seed was first distributed. Pilcrow was formerly grown sparingly in Napa and Sacramento Counties, Calif. In 1929 it was reported only from the Yakima Valley of Washington, where it was grown on about 13,000 acres under irrigation. It is well adapted to be grown under irrigation in that valley, where it is known as White Russian or Thompson Club and where it yields about the same as Dicklow and Jenkin.

## GROUP 3.—HEADS BEARDLESS; CHAFF SMOOTH, BROWN OR RED; WINTER WHEATS

The wheats listed in group 3 include three white-kerneled winter varieties, some of which are grown in both the eastern and western parts of the United States. They are grown only from fall sowing. They all have soft kernels desirable for making soft-wheat flour for biscuits and pastry. The flour is of low bread-making value.

## GOLDCOIN

Goldcoin wheat is known by many names, including Abundance, American Banner, Clawson, Eldorado, Fortyfold, Gold Bullion, Golden Chaff, Gold Medal, Goldmine, Improved No. 6, International No. 6, Junior No. 6, Klondike, New American Banner, New

Soules, Niagara, Number 6, Oregon Goldmine, Plymouth Rock, Prize-taker, Prizewinner, Rochester No. 6, Soules, Superlative, Twentieth Century, White Century, White Clawson, White Eldorado, White Rock, White Russian, White Soules, White Surprise, and Winter King. Goldcoin is commonly known in the Western States as Forty-fold. It is usually known as Number 6 in New York. Some of the names listed are for supposedly selected strains of the wheat, but none can be distinguished from the bulk parent variety.

Goldcoin has erect, compact heads with golden-brown chaff. The heads usually are distinctly clubbed at the tip (fig. 5, B). The straw or stems are purplish or reddish at maturity. The kernels are midsized, soft, and white, and most of them have a rim or collar around the brush (tuft of hairs at the tip). They are rather easily shattered from the heads at maturity. Goldcoin is grown only as a winter wheat.

Several conflicting stories of the origin of Goldcoin and its various strains have been circulated. New Soules, identical with Goldcoin, has been known since 1840 and Clawson since 1865. Both originated from plants found in fields of other varieties. The wheat that later became known as Goldcoin originated from a head found about 1890 by Ira M. Green, of Avon, N.Y., in a field of Diehl-Mediterranean. Seed was distributed by several seedsmen.

Goldcoin is now grown in two widely separated areas: (1) The humid section of the North Atlantic States; and (2) the Pacific Northwest. In the latter area it is grown in both subhumid and semiarid sections. The variety is most important in the following States in the order named: Michigan, Washington, Oregon, New York, and Idaho. In 1929 nearly 900,000 acres of Goldcoin were grown in the United States (fig. 6). Goldcoin is the most important of the common white wheats.

While Goldcoin is fairly productive, it usually does not outyield all other varieties grown in the same sections. There are certain districts in Oregon and Washington, however, where Goldcoin still is the leading variety. The most important of these districts are the southern part of the Columbia Basin, the Grand Ronde Valley of Oregon, and the section surrounding Spokane, Wash. It is best adapted to sections where high winds are not common and where the binder is used to harvest the crop.

In New York, Michigan, Ohio, and Pennsylvania Goldcoin has produced good yields in comparison with those of the soft red winter varieties. However, in most of Michigan, Red Rock, a soft red winter variety, is more productive; and in most parts of the other three States Dawson has produced higher yields than has Goldcoin. If it were not for the special demand for common soft white wheat, the acreage of Goldcoin could well be reduced in the Eastern as well as in the Western States.

Goldcoin is one of the varieties of common white wheat best suited for making starchy flour for biscuits, crackers, and pastry and for the manufacture of certain whole-wheat foods. Flour from Goldcoin is not used extensively for bread making.

#### DAWSON

Dawson (Dawson Golden Chaff) also is called Golden Bronze, Golden Chaff, Improved Amber, and White Winter. It differs from



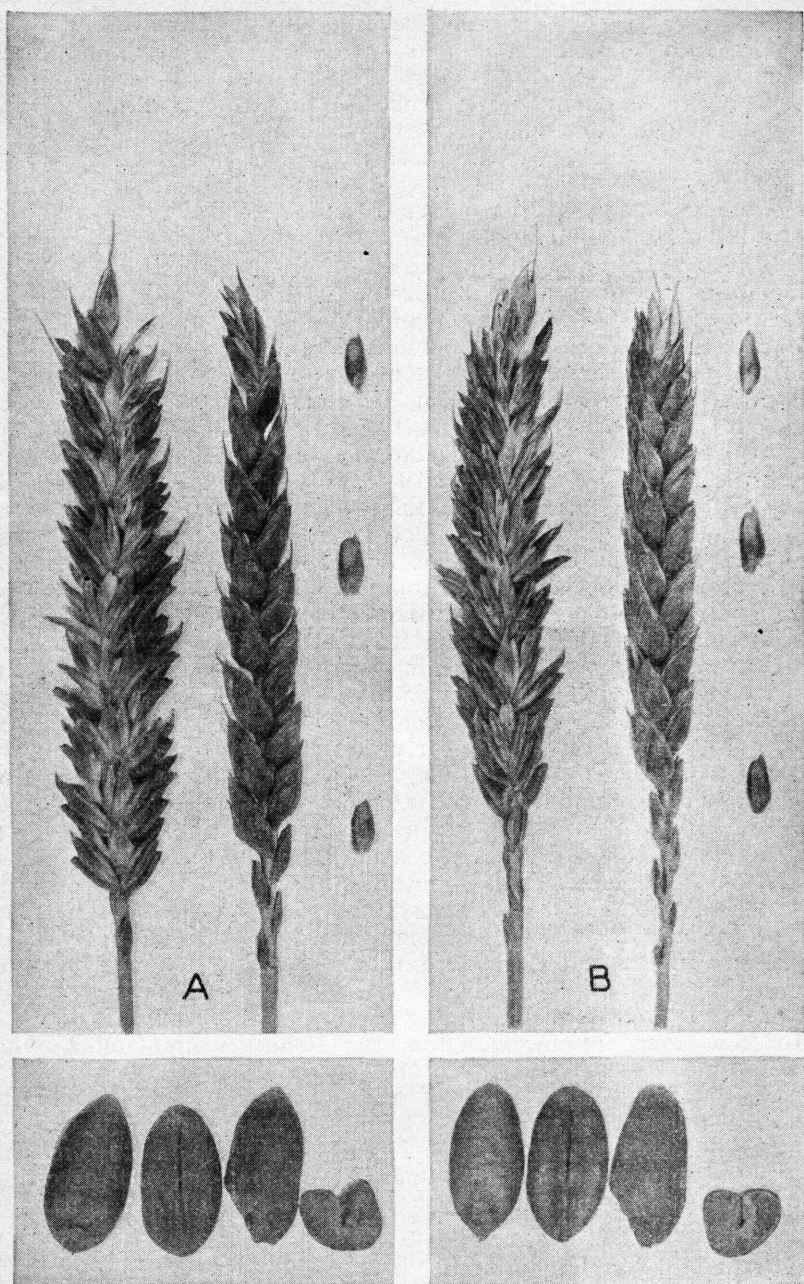


FIGURE 5.—Heads, chaff, and kernels of (A) Dawson and (B) Goldcoin. Heads and chaff, natural size; kernels, three times natural size.

Goldcoin chiefly in having white or yellow straw instead of purple and in having a square-tipped instead of a clubbed head (fig. 5, A). The kernels do not have the collar or rim around the brush. It is the most winterhardy of the white wheats.

This variety was originated from a plant found in 1881 by Robert Dawson, of Paris, Ontario, Canada, in a field of Clawson wheat. After it was found to be a high-yielding variety at the Ontario Agricultural Experiment Station, the acreage was rapidly increased.

Dawson is important in eastern Canada. It was also grown in 1929 in four States in the northeastern part of the United States. It is most important in New York and Michigan and second in importance among the true winter varieties of common white wheat grown in the United States.

In New York and Michigan Dawson yields well in comparison with other varieties. As it is a white wheat not desirable for grinding into bread flour, it is grown for special markets for biscuit and pastry flour and for breakfast cereals.

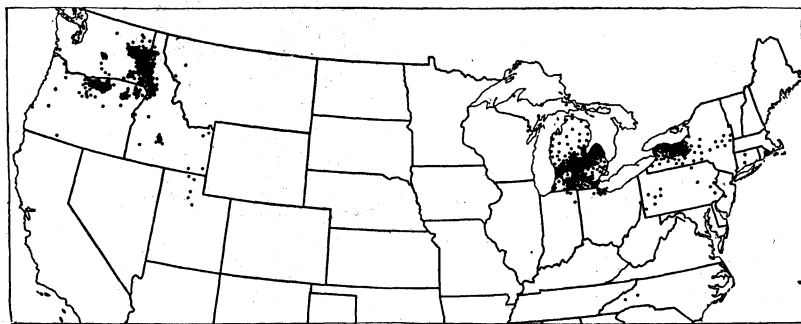


FIGURE 6.—Distribution of Goldcoin wheat in 1929. Each dot represents 1,000 acres. Estimated area, 892,000 acres.

#### HONOR

Honor cannot be distinguished from Dawson. However, it is slightly hardier, has a stronger straw, and produces better yields than Dawson. This wheat was selected from Dawson at the Cornell University Agricultural Experiment Station, Ithaca, N.Y. After having been tested for several years at the experiment station and on farms in New York, it was offered for sale in 1920.

Honor has outyielded Dawson in comparative tests in New York and apparently is the highest-yielding white wheat grown there.

#### GROUP 4.—HEADS BEARDLESS; CHAFF SMOOTH, BROWN OR RED; SPRING WHEATS

The two spring wheats in group 4 are rather promising.

#### FEDERATION

Federation is a short, fairly early spring wheat, having erect, oblong to slightly tapering heads and brown chaff. The heads are stiff, rather compact, and have almost no tip beards (fig. 7, A). The kernels are white, rather short, and usually soft. Although Federation is a spring wheat, it can be grown from fall sowing in mild climates like those of California, sections of Umatilla County, Oreg., and Walla Walla County, Wash.

Federation was originated from a cross made by William Farrer, of New South Wales, Australia, between Purplestraw and Yandilla wheats. It is the leading variety in Australia. It was introduced



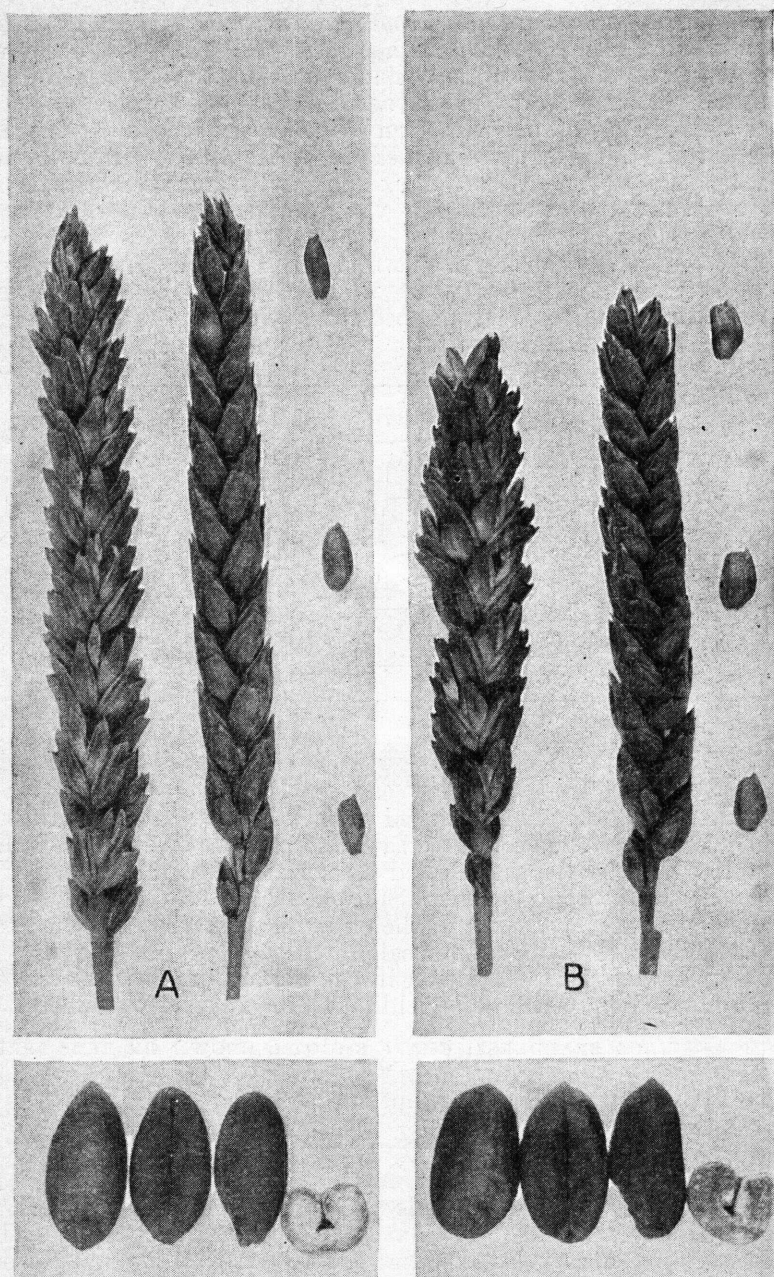


FIGURE 7.—Heads, chaff, and kernels of (A) Federation and (B) Hard Federation. Heads and chaff, natural size; kernels, three times natural size.

into the United States in 1914 by the Department of Agriculture. After having been tested in the Pacific Coast States for several years, it was first distributed to farmers in Oregon in the spring

of 1920 from the Sherman County Branch Station, Moro, Oreg. About 1,000 acres were grown in Oregon in 1922. By 1924 more than 32,000 acres were produced, and in 1929 it was estimated that about 753,000 acres were grown (fig. 8). Federation is raised extensively in Oregon, Washington, and Idaho, and on a smaller acreage in California, Montana, Utah, Nevada, Wyoming, and Colorado. It has produced exceptionally high yields under irrigation in southeastern Oregon and southern Idaho and doubtless should replace all other spring varieties, with the exception of Dicklow, in these sections.

Federation is less subject to lodging than Dicklow. It produces flour of a slightly yellow color, which sometimes meets objection from the milling trade.

Federation, although a spring wheat, is grown extensively from fall seeding on the productive lands of Umatilla County, Oreg., and Walla Walla County, Wash. It does not often winter-kill in this area because the winters are mild. It is preferred to most other varieties because of its short, stiff straw and high yields, and also because of the possibility that it can be sown in the spring in case of winter-killing.

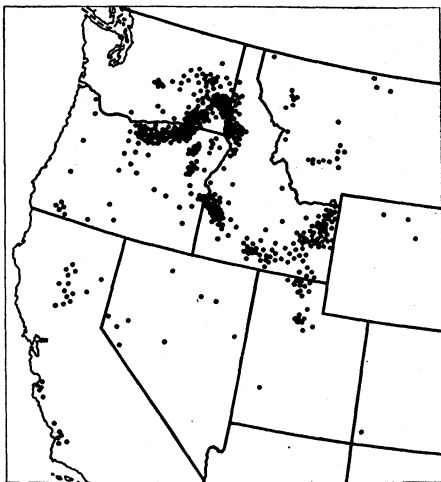


FIGURE 8.—Distribution of Federation wheat in 1929. Each dot represents 1,000 acres. Estimated area, 753,000 acres.

#### HARD FEDERATION

Hard Federation differs from Federation chiefly in being shorter and earlier and in having harder kernels. The heads of Hard Federation are erect, short, stiff, and compact, and almost free from short beards (fig. 7, B). The kernels are short, broad, thick, hard, and translucent. The straw is white and stiff and the leaves distinctly curled. Hard Federation is a true spring wheat, but is grown in California from fall sowing.

Hard Federation was selected from Federation about 1908 by J. T. Pridham at the Cowra Experiment Station in New South Wales, Australia. It was introduced into the United States by the Department of Agriculture in 1915 and was first distributed in 1920 in Oregon and California from the Sherman County Branch Station, Moro, Oreg., and the United States Plant Introduction Garden, Chico, Calif.

About 24,000 acres of Hard Federation were grown in the Grand Ronde Valley of eastern Oregon, and a smaller acreage in Sherman and Wasco Counties. It was also grown to some extent in California, eastern Washington, and Idaho.

In bread-making qualities Hard Federation is superior to almost all other common white wheats with the exception of Quality. It is nearly equal in this respect to the best varieties of hard red spring wheat.



**GROUP 5.—HEADS BEARDLESS; CHAFF VELVETY, WHITE; WINTER WHEAT**

Silvercoin is the only variety in group 5. It is of relatively small importance.

**SILVERCOIN**

Silvercoin (Hansen) wheat has beardless heads, with velvety or hairy white chaff and soft white kernels. It is of medium height and maturity. The heads are nearly erect and distinctly clubbed at the tip. The kernels are rather short and wide. The variety can be grown only from fall sowing.

Silvercoin was originated from a plant found in a field of mixed Goldcoin and Sonora wheats on the farm of Ephraim Hansen, near Mendon, Utah. It was increased and distributed in that vicinity and is now grown in Box Elder and Cache Counties, Utah.

Little is known concerning the value of Silvercoin. It probably yields less than Turkey, the hard red winter variety, in the district where it is grown.

**GROUP 6.—HEADS BEARDLESS; CHAFF VELVETY, BROWN OR RED; SPRING WHEATS**

Group 6 contains two very distinct varieties of wheat. One of these, Sonora, is rather important.

**SONORA**

Sonora, known also as Ninety-Day, Red Chaff, and White Sonora, is early and rather short and has erect, short, compact, oblong heads (fig. 9, A). The kernels are small, soft, and white. The outer chaff on each mesh of the heads has longer points or beaks than those of any other variety of beardless wheat grown in the United States. Sonora is a spring wheat, but most of it is grown in California and Arizona from fall sowing.

The origin of Sonora is unknown. The variety was grown in Sonora, Mexico, in the eighteenth century and is reported to have been brought to California by the Spanish Fathers 100 or 150 years ago. It is the oldest wheat grown in California and Arizona and still is the leading variety grown by the Indians in those States. In recent years samples of wheat identical with Sonora have been obtained from South Africa, but their history is unknown.

Sonora is grown in different quantities in all of the States west of the Great Plains area. In 1919 more than 266,000 acres were grown. In 1929 less than 92,000 acres were grown, more than two thirds of which were in California, mostly in the upper San Joaquin Valley.

Because of its earliness, Sonora often produces high yields under unfavorable conditions. Under most conditions in California, Arizona, and Utah it is outyielded by Baart and frequently by other varieties, such as Bunyip and Pacific Bluestem. It is a high-yielding variety in the upper San Joaquin Valley of California, and often produces high yields in southern Arizona, especially in unfavorable seasons. Outside of sections of California and Arizona, Sonora is outyielded by several other varieties.

Sonora wheat is used largely in the manufacture of breakfast foods. The flour is not desirable for bread making. It is graded with club wheats in the official grain standards because of its low quality and short type of kernel.

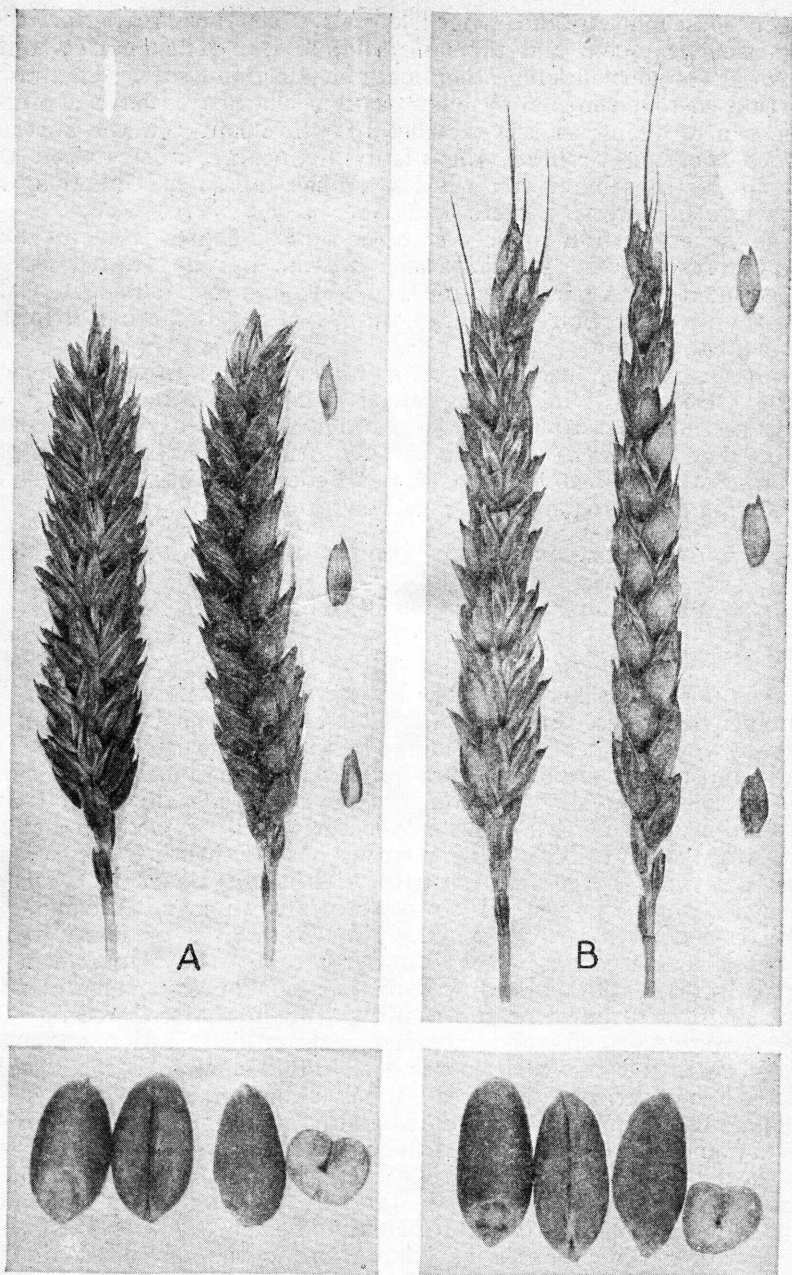


FIGURE 9.—Heads, chaff, and kernels of (A) Sonora and (B) Galgalos. Heads and chaff, natural size; kernels, three times natural size.

#### GALGALOS

Galgalos wheat, known also as Russian Red and Velvet Chaff, differs from Sonora chiefly in being taller and later and in having

longer, looser heads and longer kernels. The heads are inclined, long, slender, open, and tapering (fig. 9, B). The chaff is light brown. The kernels are rather long, slender, and soft. The straw is weak, so that the plants lodge easily. The leaves have a bluish appearance, owing to the presence of white hairs on the surface. Before shooting to head, the plants lie nearly prostrate on the ground like those of winter wheats. When fall sown, Galgalos will survive rather severe winters.

The variety was introduced into the United States from the Eri-van Government in Transcaucasia, Russia, by the United States Department of Agriculture in 1903. It was distributed in California and other States and is now grown in northern California and central Oregon.

Galgalos has produced high yields under dry conditions in several States. Because of its weak straw it is not a desirable variety for many sections. It would not be suitable for growing in the Great Plains area because of its white kernels. It could be partly replaced by other varieties, such as Baart and Federation, in the sections of California and Oregon where it is now grown.

**GROUP 7.—HEADS BEARDED; CHAFF SMOOTH, WHITE OR YELLOW; SPRING WHEATS**

Baart and Propo are the two varieties included in group 7.

**BAART**

Baart (Early Baart) wheat is known also as Arizona Baart, Columbia, Diener No. 18, and White Columbia. It has slender, tapering, rather open heads and smooth white chaff (fig. 10, B). The heads and beards are of medium length and sometimes rather short. The kernels are yellowish, long, somewhat pear shaped, and soft to semihard. The variety is rather early and of medium height. The straw is white but not very strong, as the sheath tends to bend and sometimes lodges at maturity. Although Baart is a spring wheat, it is grown from fall sowing in California and Arizona.

Baart has been grown sparingly in Australia for many years. It was introduced into the United States by the Department of Agriculture in 1900. Seed was distributed for experimental purposes in several parts of the country. From the seed received by the Arizona Agricultural Experiment Station distribution was made in Arizona, and the variety was well established in that State by 1914. From Arizona it spread to Washington, Idaho, and California. Large quantities were distributed in Oregon by the Sherman County and Harney County Branch Stations. It is now grown in all the States west of the Great Plains area. More than 765,000 acres were grown in the United States in 1929 (fig. 11). It is most important in Washington, California, and Idaho.

Baart has shown excellent adaptation to the dry lands in the Pacific Northwest. It has outyielded all other spring varieties in sections of Washington where the rainfall is less than 15 inches. It is outyielded as a spring variety by Federation on dry lands in eastern Oregon. It is the highest-yielding variety at high altitudes in southeastern Oregon and has produced excellent yields in the Sacramento and lower San Joaquin Valleys of California, where it has usually outyielded Pacific Bluestem and partly replaced it. Baart



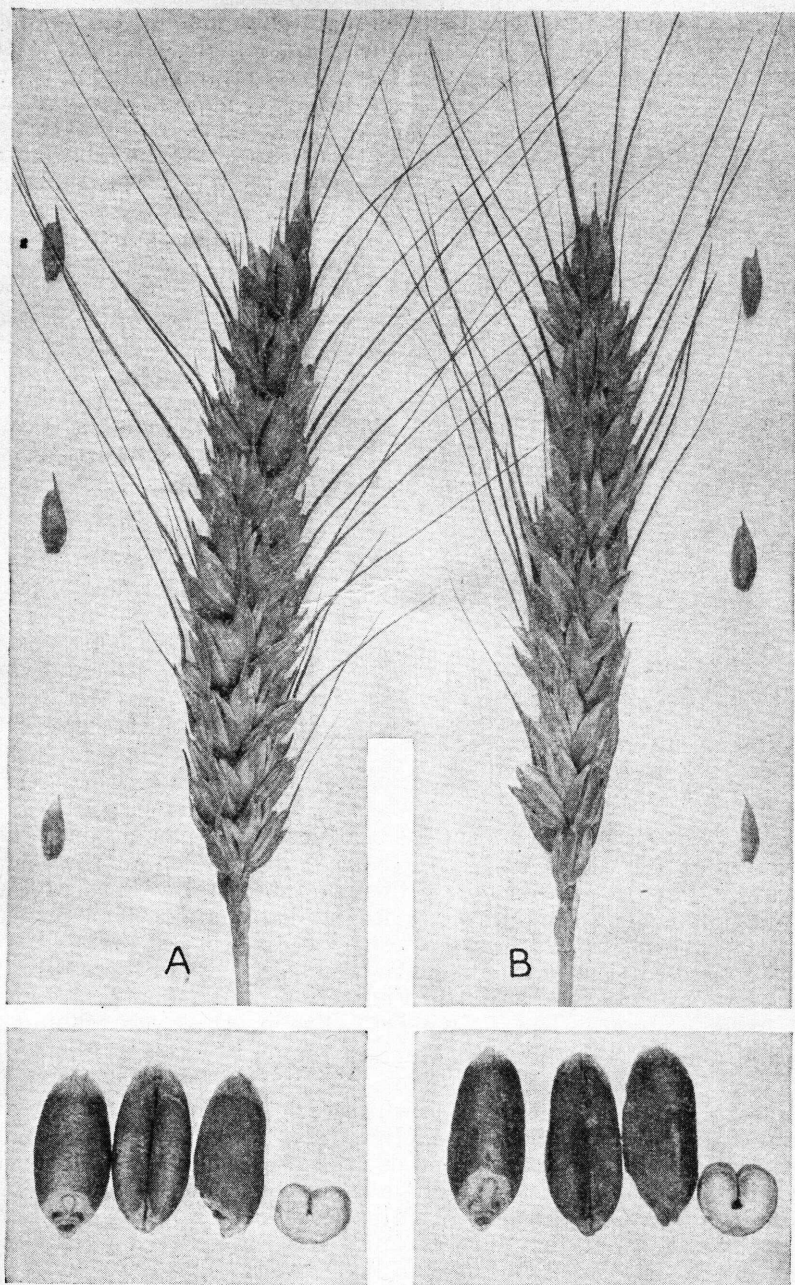


FIGURE 10.—Heads, chaff, and kernels of (A) Propo and (B) Baart. Heads and chaff, natural size; kernels, three times natural size.

usually has outyielded all other varieties on the irrigated lands of southern California and Arizona. It cannot compete with Dicklow or Federation on the irrigated lands of southern Idaho, Oregon, and Utah, and is not satisfactory for humid sections.

In bread-making qualities Baart is superior to most of the common white wheats, including Pacific Bluestem, but is not equal to the best varieties, such as Quality and Hard Federation. Its good bread-

making qualities are due to the fact that it is grown largely in dry areas conducive to the production of high-protein grain.

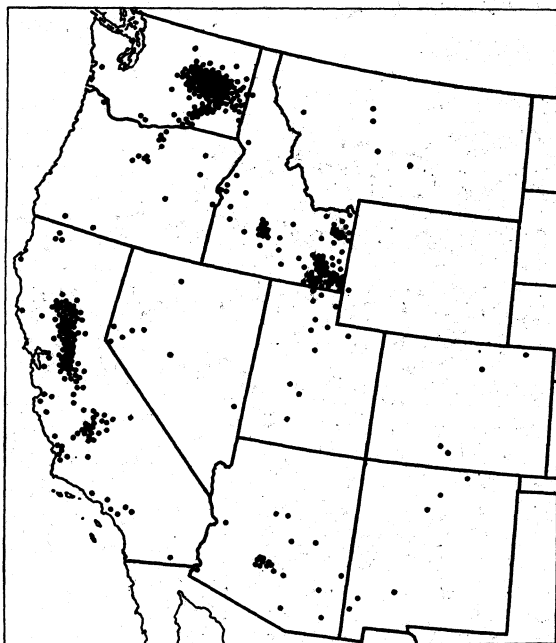


FIGURE 11.—Distribution of Baart wheat in 1929. Each dot represents 1,000 acres. Estimated area, 767,000 acres.

#### PROPO

Propo, or Proper, wheat differs from Baart in having a faintly purple straw and smaller, softer, and whiter kernels (fig. 10, A). Like Baart, it is a spring wheat, but it is grown from fall sowing in California.

Propo originated from some heads found, probably during the early seventies, in a wheat field belonging to a Mr. Proper, in Sutter County, Calif. It

was first known as Proper, but the spelling of the name soon became confused. The wheat was increased and distributed in the Sacramento Valley. Propo is now grown in the costal valleys of California. It is not an important variety, as less than 20,000 acres were reported grown in 1929.

The yields of Propo usually have been smaller than those of other varieties, such as Baart, White Federation, and Bunyip, grown in the same section. The growing of Propo, therefore, should be discontinued.

#### ADDITIONAL VARIETIES

Several other distinct common white varieties were reported grown on less than 5,000 acres each in the United States in 1929. These varieties will not be discussed as none is recommended for extensive growing. These varieties include Touse, "Zimmerman", Senier, Kofod, Powers Club, Democrat, Palisade, Martin, Foisy, Allen, Longberry No. 1, Windsor, New Zealand, Pusa No. 4, Genesee Giant, Arizona No. 24, White Odessa, and Axminster.